Integrated Safety Management and Work Smart Standards

Introduction

In the *Safety Management System Policy* (DOE P450.4) the Department commits to conducting work efficiently and in a manner that ensures protection of workers, the public and the environment. The sum of all the actions that satisfy this policy provides the DOE with Integrated Safety Management. In most instances, specific Integrated Safety Management Systems are developed in response to contract provisions that reflect DOE procurement regulations in 48 CFR (DEAR) 970.5204-2, *Integration of environment, safety, and health into work planning and execution.* Three components must be present to provide a sound platform for the practice of integrated safety management: 1) a process for the safety-integrated design of work objectives and practices; 2) a set of agreed upon standards to be used for application of the design process to specific work activities; and 3) performance objectives and measures combined with assessment methods that demonstrate when agreed upon levels of safety are being provided.

Demonstrating Integrated Safety Management is more than an internal affair between the Department and its contractors. While protecting the environment and the safety and health of the public and workers, DOE is also committed to demonstrating good stewardship of resources, and to building public trust and confidence. At each DOE location the system for delivery of safety-integrated work designs and practices must successfully engage, both a diverse and talented work force, and an inquisitive and demanding public. The Department has deliberately adopted a standards-based approach to safety management that is intended to: allow for good judgement in work design and resource allocation; create consistency and stability of expectations and accountability; permit judgement to be exercised at the level appropriate to effective innovation; and help people do their jobs through teamwork.

Within the overall context of Integrated Safety Management, the significance of Work Smart Standards is that the *Necessary and Sufficient Closure Process* (DOE M450.3-1) can be used to demonstrate that an agreed upon, tailored , and standards-based definition of work, hazards, and expected controls exists. The appropriately implemented Work Smart set of standards and requirements provides fully adequate protection of workers, the public and the environment while getting the mission work of the contract done. The *Closure Process* can be applied at the contract, facility or activity level; in all circumstances it is expected that Work Smart Standards,

faithfully developed, can be relied upon to lead to work performance that satisfies the dual imperative of the *Safety Management System Objective - Do Work Safely*.

Evidence from the Field points to a mutually supportive and evolving relationship among three related threads of development: the implementation of sets of Work Smart Standards that were developed before the DEAR changes; the more recent applications of the *Necessary and Sufficient Closure Process*; and the efforts, across the Department, to institutionalize the practices of standards-based Integrated Safety Management at various levels of work definition (Headquarters, program, field, site, facility, activity). Those who have developed Work Smart Standards report that important developments toward a more informed and accountable safety culture are associated with the effective application of the *Closure Process*. The remainder of this paper addresses how recent experience, particularly with Work Smart Standards, can be used to illustrate and amplify understanding of critical Integrated Safety Management concepts such as work-centered, tailoring and the standards-based approach. In light of this growing understanding ways that the use of the *Closure Process* can be improved are highlighted.

Types of Integration Needed in the DOE Safety Management System

The experience since the development of the Department Standard Committee has highlighted that there are many ways in which integration is called for in the DOE mission. The scope of the DOE safety integration challenge is described in the *Safety Management System Policy* (DOE P450.4): the Department commits to conducting work efficiently and in a manner that ensures protection of workers, the public and the environment. The full breadth of the activities affected by this policy is exceptionally vast. Successful integration will require the development and transmission of knowledge in three equally important ways: 1) integration actions must knit the efforts of each distinct organization involved in planning and executing the physical work; 2) these actions must satisfy the information and participation needs of the broader DOE institution, including its current regulators and stakeholders; and last but far from least, 3) the actions must acknowledge and attempt to address the needs of stakeholders in the far distant future. Considering the breadth of the latter two integration aspects, any successful DOE safety culture must ingrain a long historical perspective with an eye toward rising standards of adequacy. For these very reasons Committee members have long insisted the approach to Integrated Safety Management must be practical and grounded.

The Knowledge Base for Long Term Integrated Safety Management

Knowledge of the actual work and hazards, both past and future, is the base in which the DOE approach to safety integration is grounded. The importance of a work-centered knowledge base appears strengthened by the fact that major aspects of the DOE mission are exploratory in nature. Work design processes for exploration build upon available knowledge to the maximum extent practical; in addition they are called upon to continually demonstrate a capacity for large scale innovation. The Department's long history with scientific and technical exploration demonstrate that such activities can lead to consequences that are difficult-to-estimate or are unprecedented. Just as the early explorers could never forget to be afraid, the Department's Integrated Safety Management approach must create an organizational safety culture that is ever vigilant; one that is characterized at the working level by an ongoing, operational awareness of safety in all aspects of the work in progress. Application of Work Smart Standards at the activity, facility and site levels all demonstrate that knowledge of the work and hazards is the focal point of operational awareness.

Thus the *Safety Management System Policy* is deliberately work-centered and standards-based in its use of knowledge. Because the DOE mission is comprised of a large population of unique and diversely hazardous activities that are distributed over many locations, the Department accomplishes its work largely through contracts. Most formal Integrated Safety Management Systems are grounded in a local, standards-based, approach created by response to contract provisions which reflect DOE procurement regulations found in 48 CFR (DEAR) 970.5204-2, *Integration of environment, safety, and health into work planning and execution.* The directly affected agreements are those between DOE and its prime managing contractors, but the objectives of the DEAR also must be realized by any key subcontractors allied with the prime contractor to plan and execute the site mission. In almost all instances, Integrated Safety Management is inseparable from an already complicated, site-wide Integrated Management challenge.

Those experienced with Work Smart Standards have repeatedly emphasized the importance of recognizing that Integrated Safety Management Systems are the product of thoroughly considered agreements between DOE and the contractors. Mutual understanding of DOE and contractor roles and responsibilities promote an integrating relationship that works through agreements. Several sites report that application of the *Closure Process* has provided a method of reaching such agreements that directly illustrates most of the Guiding Principles of the *Safety Management System Policy* at work.

The Standards-Based Approach and the Use of Existing Knowledge

A standards-based approach includes that appropriate provision is made for use of the received wisdom from those whose work preceded present efforts. From DOE sites the Standards Committee has heard it also means that in meeting unprecedented challenges, whether on the frontier of science or in the treatment of legacy waste, that new knowledge will be developed that must be retained so that it becomes part of the received wisdom for successor generations. Given the unprecedented diversity of the DOE expectations environment (political, institutional, physical, work definition), discerning the successful methods of achieving standards-based integrated safety management that can be sustained over generations is one such challenge. Capturing lessons learned from the process of institutionalizing Integrated Safety Management involves a focus on points where factors of judgment, experience, innovation and prevailing wisdom converge. A standards-based approach establishes means and measures by which prudence and reliability can be achieved in each of these factors.

The DOE Integrated Safety Management approach is designed to: allow for good judgment in work design and resource allocation; create consistency and stability of expectations and accountability; permit judgment to be exercised at the level appropriate to effective innovation; and help people do their jobs through teamwork. A standards-based approach promotes public and regulatory confidence by intentionally providing the maximum practical transparency of objectives, methods and rationale for the choices required to resolve the many difficult technical challenges present in the mission. Numerous opportunities exist for improving integration in the management of hazards and in flow of information important to each safety-minded group involved with the work.

Involving Workers In the Standards-Based Approach

Effective sets of Work Smart Standards depend upon the demonstrated skills, knowledge and abilities of the DOE work force that are derived from many collective years of experience with the types of hazards characteristic of the Department's mission. For many routine activities this experience has been codified in formally promulgated standards such as are found in the DOE Directives System. Many federal, state and local regulations establish mandatory performance or process objectives that are based upon the contents of these standards. For non-routine activities, guidance documents contain best practice standards that, while falling short of providing prescriptive requirements, communicate what is known at the edge of formalized consensus standards. When the *Closure Process* is applied the contemporary knowledge present in the work force is integrated with historical knowledge found in recognized standards.

For those engaged in exploratory work design, the standards-based approach of the *Closure Process* encourages the integration of both practical knowledge and all forms of received wisdom. In the standards-based approach to Integrated Safety Management, the expectations of involved workers are addressed with standards identification processes that are tailored to the specific characteristics of the work. Such processes will develop an interdisciplinary perspective on each work activity that is appropriate to the level of work control accountability for that work. For many routine activities this will be the level of the individual researcher, crafts person or technician. Experience has shown that performance and safety improve when workers have a prominent voice in the selection of the controls they must exercise. As controls exist at many different levels in complex work systems, the standards-based approach represents a commitment to forms of integration that make sense, provide reasonable predictability and also best engage the vigilance of the workers closest to the point of control.

In the work-centered and standards-based approach to Integrated Safety Management work designs, standardized or broadly generalized requirements have a place when they can be related directly to characteristics of the work to be accomplished. For work of an exploratory nature or where potential consequences are not fully characterized by past practices, the work-centered and standards-based approach calls for vigilance in the application of familiar remedies. An informed safety culture in such conditions maintains a close awareness of the bounds of past experience and the limits of charted territory.

Engaging External and Future Expectations with the Standards-Based Approach

The degree of external oversight and public accountability that the Department must satisfy is a direct indicator of the importance present decisions carry both now and far into the future. Integrated Safety Management should leave a record of decision that will be accessible for as long as the consequences of those decisions continue. Often these consequences are expected to be around long (even thousands of years) into the future. For complex legacy cleanup activities or major big science capital investments, inevitably multiple trajectories appear to exist toward widely accepted final work objectives. Work design processes must wrestle with a range of choices that involve a tangle of mission and hazards management options, the one-right-choice situation rarely exists. A test of DOE Integrated Safety Management is that its systems reasonably and acceptably account for external opinions of proposed choices made on behalf of the present public and their descendants.

The Department has deliberately adopted a standards-based approach in part because it supports information flow to an attentive public. By incorporating applicable regulations and other recognized standards as a basis for developing adequate safety in its specific and programmatic work designs, members of the public and external oversight to the Department can develop an independent perception of the adequacy of the DOE's plans. By including in its contracts standards objective measures of performance, the ability of present and future observers to evaluate and participate in these ongoing challenges is enhanced. The DOE *Safety Management System Policy* presupposes active and continuing Openness Programs for dialogue with various constituents for the Department's activities.

Three Components of an Integrated Safety Management Framework

The concepts of integration are contained in the *Safety Management System Policy*. These concepts are incorporated functionally in the DEAR 970.5204-2, *Integration of environment, safety, and health into work planning and execution.* The concepts and the DEAR are designed to support the alignment of multiple organizations around a diverse statement of work. It can be shown from the DEAR that three components must be present to provide a sound foundation for the practice of integrated safety management: 1) a process for the safety-integrated design of work objectives and practices; 2) a set of agreed upon standards to be used in application of the process to specific work activities; and 3) performance objectives and measures combined with assessment methods that demonstrate when agreed upon levels of safety are being provided. For specific contracts, the elements of work design and work performance processes selected to comprise these component functions are the actual standards committed to writing in tailored agreements between the contract parties.

The Guiding Principles and the Five Functions of Integrated Safety Management are used to establish the collection of contract-level standards which will then be reflected in the infrastructures established by DOE and the contractors for delivery of safe work. A significant feature of the DOE approach to Integrated Safety Management is that by embracing a logic of continual improvement for all aspects of safe-work definition, the process of developing the standards for a contract can and should provide a simultaneous demonstration of the integration concepts in action. To achieve this robust internal integration, processes for standards identification must achieve the relatively high level of self-awareness about how and why the agreed upon standards were selected. This connection between process and product in the Integrated Safety Management is reflected in the key features of the *Closure Process,* especially in use of the multiple team structure.

Work Design, Work Performance, and the Work Smart Identification of Standards

Within the overall context of Integrated Safety Management, the significance of Work Smart Standards is that the *Necessary and Sufficient Closure Process* (DOE M450.3-1) is used to conclusively demonstrate that an agreed upon, tailored , and standards-based definition of work, hazards, and expected controls exists. The appropriately implemented Work Smart set of standards and requirements provides fully adequate protection of workers, the public and the environment while getting the mission work of the contract done. The *Closure Process* can be applied at the contract, facility or activity level; in all circumstances it is expected that Work Smart Standards, faithfully developed, can be relied upon to lead to work performance that satisfies the dual imperative of the *Safety Management System Objective - Do Work Safely*.

The *Closure Process* encourages extensive, self-reflective, internal iteration on outcomes, barriers and means as the mechanism for arriving at robust conclusions on a wide variety of uncertain conditions. Those who have developed sets of Work Smart Standards recognize that the Core Functions for Integrated Safety Management are directly reflected in the standards identification logic of the *Closure Process.* It is regularly reported that the interaction between the Work Smart Convened Group and the Identification Teams leads to a more comprehensive picture of all work elements and associated hazards than was previously available. That picture enables those involved in the process to better grasp the relationship among various hazards and thus to better define the components of a balanced set of priorities for common safety infrastructure and work-center tailored safety management plans. An effective balance between these risk management factors is known to enhance integration. Standards identification must begin with the work to achieve this benefit.

Using the DEAR as Benchmark Criteria for Comprehensive Integration of Standards

As a benchmark, 48 CFR (DEAR) 970.5204-2; *Integration of environment, safety, and health into work planning and execution* provides more than 30 regulatory attributes of successful integration in Integrated Safety Management systems for the Department's performance-based contracts. Collectively, the attributes of the DEAR influence all aspects of a contract including, "the contractor's business processes for work planning, budgeting, authorization, execution and change control." It has become customary to use the term "integrated safety management" in a broad sense, and generally to refer to all those contract activities that comprise the contractor's response to each of the 30-plus attributes. It must be remembered that the call for integration in

the *Safety Management Policy* is comprehensive and includes actions of both DOE and the contractor. The development of Work Smart Standards using the *Closure Process* provides a mechanism for achieving and demonstrating at least a portion of such comprehensive integration.

Scoping the Set of Work Smart Standards

With the incorporation of a substantially expanded set of safety management success attributes in the DEAR, added considerations exist when the decision to apply the *Closure Process* is made. The *Closure Process* is fully adequate in designating the full range of general bounding conditions that must be established before the work of standards identification may begin. The *Closure Process* has the flexibility to deal with the full set of attributes in a variety of ways depending upon local considerations, but "Process Element 1: Defining the Work and Hazards"does require that each of the attributes be dispositioned as part of the work or a boundary condition to it.

In order to proceed effectively in scoping a set of Work Smart Standards a consistent relationship must be established between Work Design Processes and Work Performance Processes. This is a very important act of discernment that is performed by the Convened Group. It is important because many applicable regulations (e.g. 29 CFR 1910 for Occupational Safety and Health), which must be incorporated in the documentation of the Work Smart Standards set, include both work design requirements (e.g. 1910.119, Process Safety Management) and work performance requirements (e.g. 1926, Construction Safety). In addition familiar "management standards" (e.g. Lockout/Tagout of Energy Sources, or for safety analyses) may address requirements in several distinct regulatory sources (i.e. OSHA and DOE, or OSHA, NRC, EPA and DOE).

Some "management standards" relate to work design (e.g. conduct of engineering) others relate more evidently to work performance (e.g. conduct of operations or maintenance). Others can be fit in either category (e.g. hazard analysis, self assessment). There appears to be a rough consensus about what topics most safety management systems should address, but there is no single standard that reflects these topics. In satisfying the DEAR 970.5204-2 and related performance-based contract provisions all of these topics must be addressed in establishing the three component legs of the Integrated Safety Management framework:

(1) a process for the safety-integrated design of work objectives and practices
(2) a set of agreed upon standards to be used in application of the process to specific work activities
(3) performance objectives and measures combined with assessment methods that demonstrate when agreed upon levels of safety are being provided.

The potential for confusion in scoping the set of Work Smart Standards can be minimized if the distinction between work design expectations and work performance standards is maintained in the instructions to the Identification Teams and the selection of standards is focused on the needs of the subject work.

Application of the *Closure Process* Helps Balance Priorities and Clarify Roles and Responsibilities

Several sites have reported that Work Smart Standards which reflect comprehensive understanding of the work and hazards improves the contractor's ability to prepare an effective Integrated Safety Management system description. The Oak Ridge Integrated Project Management System is a collaborative effort of those experienced with several initiatives to apply Work Smart principles to activity and project level work. A comprehensive understanding of the contract work and hazards also improves DOE staff's ability to present and defend the infrastructure investments required to achieve the intended level of integrated performance. At the Albuquerque Operation Office, clearly defined sitewide perspectives strengthen the next level of management decision making with a series of Integration Control Boards which apply the Integrated Safety Management Guiding Principles to achieve balance of priorities and clarity of responsibilities across multiple sites.

Experience at several sites in developing Integrated Safety Management System descriptions indicates that the balance of priorities established in contracts that contain Work Smart Standards is closely aligned with the site's strategic mission. Those balance of priorities are also tailored effectively to take strategic safety advantage of historic strengths in the instituitional systems for the design and performance of work. Laboratories such as FermiLab, Lawrence Berkeley, and Los Alamos all report a new sense of coupling between researcher enthusiasm for new science and the institutional commitment to *Do Work Safely*. This strengthening of integration is attributed to what was learned from the large scale interaction and iteration that occurs during the work definition, hazards analysis and standards identification steps leading to the Work Smart Standards set.

Satisfied sites emphasize that the effective application of the *Closure Process* provided many first hand experiences of how to enhance integration, both within the Responsible (contractor) Organization, and between DOE and contractor management. Improved communications and better understanding of the respective DOE and Contractor roles and responsibilities for the

completion of the contracted mission are often reported as collateral benefits that come from the intense interactive effort required to define the work and to agree upon Work Smart Standards for the safe performance of that work.

Role Clarity in *Closure Process* Teams Strengthens Tailoring and Sharpens Work Smart Standards Applicability

Integrated Safety Management policy states that direct involvement of workers during the development and implementation of safety management systems is essential for their success. The *Closure Process* requires systematic involvement of interdisciplinary teams of workers. Through use of those who are the most knowledgeable of the actual work and hazards, and by the process of tailored work design, the set of performance expectations for a particular piece of work becomes Work Smart . Specific features of the *Closure Process* directly support top-down Line Management in the tailored application of its safety responsibilities. Other features tap the work-centered practical experience of local workers who will use the selected standards. The management control structure of the process distinguishes between two important and distinct vantage points during work design. This is reflected in the differing roles and responsibilities assigned to the Convened Group and to the Identification and Confirmation Teams.

A known key to Line Management accountability for safe work designs is the ability to achieve vertical integration of general expectations, particularly when multiple Program Offices provide resources to sustain the standards-based infrastructure or system of delivery for *Doing Work Safely*. In the *Closure Process* the Convened Group is the focal point for all external expectations that must be factored into the final work definition supported by the Work Smart Standards set. The *Closure Process* addresses many important requirements and criteria to the function of process leadership as represented in the Convened Group. This is because much of the actual integration benefit of the Work Smart Standards set cannot be realized without the representative, active and informed participation (i.e. implementation integration) of all Line Management parties to the final agreement.

Experience has repeatedly demonstrated that when the Convened Group includes authorized representatives of all the major parties that must agree upon and subsequently support implementation of the standards, the process produces a more satisfactory result from the top-down perspective of the involved Line chains of responsibility. The Convened Group may need to reflect several levels of management in both the contractor and DOE organizations in order to be appropriately representative. When size limits the number of working participants, the

business of the Convened Group must be conducted on a pace and schedule that permits the Group's representatives to keep key parties that are indirectly represented adequately informed.

DOE Directives and their Use in Work Smart Standards of Broad Applicability

The DOE Directives are used by the Identification and Confirmation Teams in the manner specified by the Convened Group in the protocols and other direction provided to ensure the adequacy criteria of the *Closure Process* will be satisfied. The DOE Directives System is a general requirements structure similar in content to that found in most formalized safety regulation systems. However, most DOE directives are not "requirements of general applicability", a type which are required by law (the Administrative Procedures Act) to be developed and promulgated under strict rules for public participation. Rules in the 10 CFR 800 and the 48 CFR (DEAR) are exceptions to this statement.

The principal effect of the DOE Directives System is to organize the work of DOE employees - apart from, but in relation to, the portions of the Department's mission that are delegated to contractors to perform. For a second function, as indicated in DEAR 970.0470-1, the Directives System can provide a point of departure for the determination of contract specific reference standards. In the System the individual directives reflect a wide variety of prescription; they range in force of applicability from regulation (e.g. DEAR 970.5204-2, and 10 CFR 835) to discretionary suggestion (e.g. best practice surveys).

The set of Directives is widely considered to be comprehensive in the collection of technical, financial and safety management factors its addresses. However, few claims are made as to the System's consistency of treatment in terms of detail, susceptibility for tailored application, reference to contemporary practice, or cogency in terms of management philosophy. In reality the Directives System reflects the diversity and complexity of the DOE mission and the plurality of those who collaborate in performing that mission. It is difficult to imagine a different situation prevailing.

In respect to the limits of the received wisdom, the Directives System contents, taken as a whole, demand vigilance in any assessment of potential applicability to a specific contract. Experience illustrates there are DOE Directives that the Department Contracting Official is likely to require be included in the contract under any foreseeable circumstances (e.g. Safeguards and Security, and Nuclear Explosives Safety). For the determination of Work Smart Standards it is important to recognize that such a requirement may exist in the DOE institutional domain quite apart from

any specific need that would appear from a strictly local consideration of the work activity and the design options for its accomplishment. In these cases inclusion of the directive in the Work Smart set is presented as a boundary condition to be satisfied by the set. This does not preclude tailored application of the directive or even selection of only the portion of the directive's contents that directly apply to the work at hand. The methods of tailoring available in this circumstance differ from the situation where a change in work design can lead to elimination of a hazard and as a result lead to a streamlined, more Work Smart set.

But many directives contain reference to details found in yet other recognized or available standards. Or they may address actions of DOE officials that influence but do not direct the design or performance of the contractor's work (e.g. federal personnel administration). In many such instances DOE has long accepted that reference to such directives in contracts is not needed. Other situations may be less obvious. For example, there may be circumstances when DOE directives relating to the training and qualification of federal employees are pertinent to establishing roles and responsibilities for authorization of the contractor's work. In such a circumstance DOE may concur that inclusion of DOE performance-related directives in the contract is appropriate to achieve statement of work objectives in a performance-based contract. There is clearly no single approach with which to disposition the applicability of DOE directives to a specific contract.

The Convened Group Guides the Treatment of DOE Directives

The Work Smart approach to Integrated Safety Management involves taking a work-centered vantage point on incorporation of DOE directives. This vantage point must be broad enough to include aspects of the contract's performance objectives that include responsibilities that are unique to DOE as an agreement party. The Integrated Safety Management Guiding Principle of tailored work design should preclude the unilateral imposition of individual directives where legitimate more efficient alternatives exist. But tailored work design need not prevent the adoption of a DOE standard, for contractor use, in favor of an alternative standard in the interest of streamlining implementation. In the *Closure Process* for development of Work Smart Standards, the primary responsibility for vigilance in the treatment of DOE directives falls upon the Convened Group. This requirement is one of the most critical in the Work Smart approach.

Various Identification Teams are established to define (and refine) the work design, identify the hazards and develop controls (Integrated Safety Management Functions 1-3); the roles and responsibilities of the teams is strictly and purposely limited within the *Closure Process*. This is

done to enable the designated participants on these teams to seek innovative solutions to work design problems with a degree of freedom, yet the actual degree of freedom is determined by the Convened Group. How much authority to innovate the Convened Group delegates to the Identification and Confirmation steps of the process will depend upon how the contract level objectives of the Agreement Parties are framed during the Initiation of the Process (Chapter I).

Regardless of the range of authority granted to the Identification Teams it remains the responsibility of process management on the Convened Group to determine the final boundary and implementation conditions that the Work Smart set must satisfy. There have been a wide variety of approaches to incorporation of Directives in the Work Smart Standards set for contracts. In most instances an iterative approach to consideration of the DOE directives has led to strengthening the original Work Smart set. At present, where a DOE - contractor team sit in relation to implementation of Integrated Safety Management can have a distinct bearing on the considerations for the scope of the *Closure Process* application.

Possible Options for Expanded Use of the *Closure Process*

Those who have experience with development of Work Smart Standards recognize that all the Core Functions for Integrated Safety Management are directly reflected in the overall standards identification and implementation logic of the *Closure Process*. It is regularly reported that the interaction between the joint DOE and contractor Convened Group and the various Identification and Confirmation Teams established for a contract level application of the process leads to a significantly more comprehensive picture of all work elements associated hazards than was previously available. That picture enables those involved in the process to better grasp the relationship among various hazards and thus to better define the components of a balanced set of priorities for common safety infrastructure and work-center tailored safety management plans. What can be seen in these experiences is a diminishment of uncertainty and a corresponding increase in confidence between the Agreement Parties. This is because the *Closure Process* incorporates proven features for reaching action agreements in the face of significant uncertainty; agreements that are standards-based, but that are also risk-tolerant to the point the innovation can be safely incorporated where needed.

To move beyond the effectiveness of previous practices, performance-based contracting with standards-based integrated safety management must strengthen relationships between DOE and its contractors. Many of the field observations about experience with Work Smart Standards and Integrated Safety Management suggest that the *Closure Process* may provide a beneficial way of

reaching comprehensive agreements in those situations where widespread engagement with the agreed upon expectations is needed and the parties to be engaged are normally involved in very diverse activities and are uncertain of one another's roles. The creation of a *Do Work Safely* culture that can give a sense of urgency for achieving the Integrated Safety Management commitments contained in a contract is an example of such a situation. This suggests, for example, that use of the *Closure Process* in some manner might strengthen the relationship of the Integrated Safety Management System description called for by the DEAR with the collection of individual practices its describes. A similar notion might be applicable to the development of annual performance measure and self assessment plans.

Conclusion

This paper has examined several aspects of the relationship between Work Smart Standards and the institutionalization of Integrated Safety Management. Many features of the experience since the introduction of the *Necessary and Sufficient Closure Process* and the *Safety Management System Policy* reinforce the conclusion that the *Closure Process* can be instrumental in developing a strong foundation for Integrated Safety Management. Lessons Learned with Work Smart Standards can be used to amplify how the required control features of the *Closure Process* incorporate the Guiding Principles of Integrated Safety Management. This principles-based controls feature is a key element in accounting for the benefits reported from this process for standards identification. With the promulgation of the Integrated Safety Management DEAR provisions a comprehensive, contract-level framework for achieving integrated performance has been created. It is a framework that incorporates formal agreements between DOE and contractors that are regularly updated to reflect emergent uncertainties within the total expectations environment for the DOE mission. The need to continually manage uncertainty has demonstrated the value of an exploratory approach to work design.

The concept of the standards-based approach embodied in the *Closure Process* reflects the needed properties of an exploratory work design process for conditions of significant uncertainty. Given that development of Integrated Safety Management Systems is still in an early stage, where many uncertainties are present there is reason to expect that the *Closure Process* could be used to aid in addressing some of the more complicated uncertainties. At present these suggestions seem plausible and thus there is a basis for expecting that continued refinement and development of the knowledge base that supports application of the *Closure Process* will also enhance and speed the achievement of the Department-wide objective of the *Safety Management System - Doing Work Safely*.

Note: Items not dealt with in any detail in this draft include a) Performance Measures, b) Interfaces between Prime and Subcontractors, c) Implementation Assumptions, and d) Design Standards.